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XXXIX.—*A List of Birds collected or observed on the Lower, Southern, and South-western Slopes of the Volcano of Miravalles and on the lower lands extending to Bagaces in Costa Rica, with a few Observations on their Habits.*
By C. F. UNDERWOOD*.

FROM the beginning of August 1895 till the end of December of the same year, accompanied by my brother and my museum assistant, I was collecting in the vicinity and on the lower slopes of Miravalles, extending my trips also, occasionally, to Bagaces.

To reach our destination our route lay up the Gulf of Nicoya, then up the River Tempisque, branching off into the "Rio de las Piedras," and up until this river is joined by the River Señorío Grande. In the fork of these two rivers is situated the little town of Bebedero. Here we landed some twenty-one hours after leaving Puntarenas, our trip being made, part of the distance in the small mail-steamer, and partly in a dug-out canoe. Our equipage was heavy and the canoe small, the gunwale being but a few inches above the water, which accounted partly for our low speed.

* [This paper was sent by the authorities of the National Museum of Costa Rica to me, and I have since seen a portion of Mr. Underwood's collection. I am thus in a position to make the few supplementary notes which will be found below, with my initials.—O. SALVIN.]

From Bebedero, which is but little above sea-level, one begins to ascend gradually, until Bagaces is reached after some three hours' horseback travelling, the estimated altitude of this village being some 210 feet. From there to the dwelling-house of the hacienda Miravalles the ascent becomes more apparent, and in four hours—the time the journey usually occupies—one reaches approximately 1450 feet.

In my excursions I rarely climbed more than about another 500 to 800 feet; therefore the locality denominated "Miravalles" on my labels can be estimated as varying between 1400 to some 2000 feet above the sea-level.

TURDIDÆ.

† CATHARUS MEXICANUS, Bp.

Only one taken, shot in the deep forest.

TURDUS MUSTELINUS, Gm.

One taken, no more seen.

TURDUS USTULATUS, Nutt.

Only one secured.

† TURDUS TRISTIS, Sw.

Abundant in the forest, feeding on the fruit of the *Higueron* and other trees. Somewhat wild, seeming to perceive one from a long distance.

† TURDUS GRAYI, Bonap.

Now and again observed near habitations, but not by any means common. Native name "Yigüirro."

SYLVIIDÆ.

POLIOPTILA ———?*

A very common bird, frequenting trees in comparatively open country and scrubs, in preference to virgin forest. I have found it equally as common in Bebedero and Bagaces as on Miravalles.

* [Specimens of both *P. bilineata* and *P. albitoris* are in the collection sent, and it becomes more than doubtful if these birds can still be kept separate.—O. S.]

TROGLODYTIDÆ.

† CAMPYLORHYNCHUS CAPISTRATUS (Less.).

Very abundant in the *piñuelos* forming the hedges enclosing fields, both in the upper and lower lands. The native name is "Salta-piñuelo" (piñuelo-jumper).

† HENICORRHINA LEUCOPHRYS, Tsch.

Not uncommon in virgin forest; it is a silent bird, generally preferring the thick under-brush.

‡ THRYOPHILUS PLEUROSTICTUS (Sel.).

Rather plentiful in hedges and the scrubby foliage dotting open spaces.

+ SALPINCTES GUTTATUS, Salv. & Godm.*

In the forest-bordered pasture-grounds of Miravalles one sees, dotted here and there, collections of lichen-covered boulders. The first specimen of this bird that I shot was perched on one of these stone piles. It was strange to me, and I searched carefully for more, but found it rare; however, I succeeded in getting three or four others myself, and had one or two brought me by a native hunter, whom I had instructed where to look for it. All of them were taken on these stone heaps, nor have I seen them elsewhere.

MNIOTILTIDÆ.

MNIOTILTA VARIA (Linn.).

Common in all parts.

HELMINTHOPHAGA CHRYSOPTERA (Linn.).

One taken.

DENDRÆCA ÆSTIVA (Gm.).

Common everywhere.

DENDRÆCA PENNSYLVANICA (Linn.).

Common.

DENDRÆCA BLACKBURNIÆ (Gm.).

One specimen taken.

* [Mr. Underwood's specimens agree with the birds from the Volcan de San Miguel, Salvador, described in 'The Ibis' for 1891, p. 609. —O. S.]

SEIURUS AURICAPILLUS (Linn.).

Found feeding on the ground in the forest; rather common.

SEIURUS NOVEBORACENSIS (Gm.).

Not so common as *S. auricapillus*; one specimen only procured.

OPORNIS FORMOSA (Wils.).

A forest lover.

+ GEOTHLYPIS CANINUCHA, Ridgway.

Plentiful in the natural *potreros*, or pasture-grounds, and swamps, dodging in and out of the long grass.

MYIODIOCTES CANADENSIS (Linn.).

Common.

‡ BASILEUTERUS CULICIVORUS (Licht.).

One of the commonest Warblers, seeming to confine itself, however, to the forests.

BASILEUTERUS LEUCOPYGIUS, ScL. & Salv.

Now and again observed by the riversides; not common.

BASILEUTERUS MESOCHRYsus, ScL.

Common in the open and outskirts of the forest.

SETOPHAGA RUTICILLA (Linn.).

Seems to be common.

VIREONIDÆ.

VIREO OLIVACEUS (Linn.).

Common.

VIREO FLAVOVIRIDIS (Cassin).

Plentiful in second-growth forest. Native name "Faile."

VIREO PHILADELPHICUS (Cassin).

Fairly plentiful.

VIREO FLAVIFRONS, Vieill.

A few examples procured on the outskirts of the forest.

HYLOPHILUS DECURTATUS (Bonap.).

Common from Miravalles to Bebedero.

HYLOPHILUS OCHRACEICEPS, ScL.

Prefers the forest; not nearly so common as *H. decurtatus*.

HIRUNDINIDÆ.

HIRUNDO ERYTHROGASTER (Bodd.).

One shot on the wing between Bagaces and Miravalles.

CÆREBIDÆ.

† CHLOROPHANES SPIZA (Linn.).

Several seen and taken.

† CÆREBA CYANEA (Linn.).

Various taken. Native name "Picudo."

TANAGRIDÆ.

EUPHONIA AFFINIS, Less.

Common.

EUPHONIA HIRUNDINACEA, Bonap.

Taken in company of *E. affinis*, feeding on fruit.

TANAGRA CANA, Sw.

Nothing near so common as in the interior. Native name "Viuda" (widow).

PIRANGA RUBRA (Linn.).

Common. Native name "Cacique."

† PHÆNICOTHTRAUPIS VINACEA, Lawr.

Common in Miravalles. A very noisy bird, found in the thick forests in small bands searching for insects.

† EUCOMETIS SPODOCEPHALA (Bonap.).

Found from Bebedero up to the highest point at which I collected. In Miravalles it is much more plentiful than lower down. Generally seen in bands of four or five, also seen frequently along with *Phænicothraupis vinacea* in those constantly moving columns of birds composed of Tanagridæ, Formicariidæ, Dendrocolaptidæ, and others, that make the woods seemingly all at once resound with their notes, and then pass almost as suddenly away, leaving the spot silent as before.

ARREMON AURANTHIROSTRIS, Lafr.

Rather uncommon; seen principally on outskirts of forest in the under-brush.

SALTATOR MAGNOIDES, Lafr.

Common from here to Bebedero.

FRINGILLIDÆ.

AMAUROSPIZA CONCOLOR, Cab.*

Two specimens procured on the forest edge; no others noticed.

GUIRACA CÆRULEA (Linn.).

Rarely met with; only three specimens procured.

GUIRACA CONCRETA (Du Bus).

But one specimen procured.

CYANOSPIZA CIRIS (Linn.).

Two specimens taken near Bagaces and one in Miravalles. In the former district I saw various others.

COTURNICULUS PASSERINUS (Wils.).

Found in open savannas; not uncommon.

! HÆMOPHILA RUFICAUDA (Bonap.).

Not particularly common; habits similar to those of *Embernagra superciliosa*, and seen occasionally in its company searching for insects on the piñuclos (*Bromelia pinguin*). Specimens taken in Miravalles, Bagaces, and Bebedero.

HÆMOPHILA RUFESCENS (Sw.).

But few specimens secured; does not appear common; these were taken at forest borders and scrubs.

EMBERNAGRA SUPERCILIOSA, Salv.

In Miravalles not uncommon; seen on the outskirts of forest and in second-growths, always near the ground; found by the roadside leading to Bagaces and Bebedero.

EMBERNAGRA STRIATICEPS, Lafr.

Not nearly so common as *E. superciliosa*; this is taken also in Bagaces. A lover of second-growth woody lands,

* [A specimen sent doubtless belongs to this rare species.—O. S.]

borders of forest, and hedges of piñuelo; like *E. superciliosa* seldom seen in the thick forest.

SPIZA AMERICANA (Gm.).

Three examples of this bird taken.

ICTERIDÆ.

GYMNOSTINOPS MONTEZUMÆ (Less.).

Several specimens taken at highest point of my rambles.

Known by the natives as "Oreopendula."

+ *STURNELLA MAGNA* (Linn.).

Plentiful in "zacatales" (stretches of land covered with long wild grass). Goes by name of "Zacatero."

ICTERUS BALTIMORE.

Common from Bebedero to Miravalles. Native name "Cacique veranero."

+ *ICTERUS PECTORALIS* (Wagl.).

Specimens procured were shot near Bagaces in trees dotting swampy potreros, accompanied by *I. pustulatus*; taken also in Bebedero. Native name "Chiltote."

CORVIDÆ.

+ *PSILORHINUS MEXICANUS*, Rüpp.

Not so common as the following species. Its place seems to be usurped by the blue species.

+ *CALOCITTA FORMOSA* (Sw.).

In habits it seems to resemble *Psilorhinus mexicanus*, even the note is very similar, though easily distinguishable.

TYRANNIDÆ.

+ *PLATYRHYNCHUS CANCROMINUS*, ScL.

Not uncommon in the thick forests, fearlessly alighting within a yard or so of the observer.

+ *RHYNCHOCYCLUS CINEREICEPS*, ScL.

Several seen and taken.

+ *TODIROSTRUM CINEREUM* (Linn.).

Fairly common; seen everywhere between here and Bebedero.

+ ONCOSTOMA CINEREIGULARE, Scl.

Common; in habits similar to *Platyrhynchus cancrominus*.

+ MIONECTES OLEAGINUS (Licht.).

Some few examples procured.

+ ELAINEA PLACENS, Scl.

Several procured; prefers the open.

+ MYIOZETETES SIMILIS (Spix).

Common from Bebedero to Miravalles.

+ MYIODYNASTES LUTEIVENTRIS, Bonap.

Common.

+ MYIODYNASTES AUDAX (Gm.).

Common.

+ MEGARHYNCHUS PITANGUA (Linn.).

Common.

+ MUSCIVORA MEXICANA, Scl.

Miravalles is the only place in which I have seen this bird at all plentiful. Its extreme tameness and familiar cry render it conspicuous and an easy prey. Native name "Rey de los traga-moscas" (King of the Flycatchers).

+ MYIOBIUS SULPHUREIPYGIUS (Scl.).

Not uncommon.

+ CONTOPUS BOREALIS (Sw.).

One specimen procured in a patch of forest, a favourite hunting-ground of mine. There was an open spot where some trees had been felled, and whenever I happened to be in the neighbourhood I made a point of visiting it, and going straight to a certain tree looked for a particular dry twig, and there nearly every time I observed a *Contopus*.

This specimen was taken on the afore-mentioned twig, and was the only one secured by me during my stay in Miravalles.

+ TYRANNUS MELANCHOLICUS (Licht.).

As in most places, common in open country and by the roadside.

+ *MILVULUS TYRANNUS* (Linn.).

Few seen.

+ *MILVULUS FORFICATUS* (Gm.).

This species I found in November and December very abundant in Bagaces and its vicinity, where numbers could be seen in the air or perched on the telegraph-wires, but in Miravalles it was rather uncommon.

PIPRIDÆ.

+ *PIPRA MENTALIS*, Scl.

One female taken; no others observed.

+ *PIPRA LEUCORRHOA*, Scl.

Two or three specimens taken; few others seen.

+ *CHIROXIPHIA LINEARIS* (Bonap.).

This is the commonest of the Pipridæ, a very conspicuous bird. On account of its note it is called by the natives "Toledo."

+ *HETEROPELMA VERÆ-PACIS*, Scl.

In Miravalles quite rare; my specimens were shot in the deepest forest.

COTINGIDÆ.

+ *TITYRA SEMIFASCIATA* (Spix).

Seen occasionally, but cannot be called abundant. Natives call it "Pajaro-chancho" (Pig-bird) on account of its note, which somewhat resembles the grunting of that animal, but in a higher key.

+ *AULIA RUFESCENS* (Scl.).

Only one specimen procured; apparently a very rare bird.

+ *LIPAUGUS HOLERYTHRUS*, Scl.

Several specimens procured, but not by any means common.

+ *ATTILA SCLATERI*, Lawr.*

Occasionally seen in the thick forests, but not abundant.

* [The specimens sent most resemble *A. sclateri*, but they vary a good deal *inter se*.—O. S.]

DENDROCOLAPTIDÆ.

XENOPS GENIBARBIS, Ill.

Common, extending its range to Bebedero.

SCLERURUS GUATEMALENSIS (Hartl.).

In Miravalles very rare.

DENDROCINCLA HOMOCHROA (Scl.).

This and *Picolaptes compressus* are about the commonest of the Dendrocolaptidæ found in Miravalles, both being met with in company with various other species of same family and of the Formicariidæ, following up the columns and feeding on the black migratory ant.

SITTASOMUS OLIVACEUS, Wied.

Common in Miravalles.

DENDRORNIS NANA (Lawr.).

Rare.

DENDRORNIS LACRYMOSA, Lawr.

Rare; only one taken.

PICOLAPTES COMPRESSUS (Cab.).

Quite common.

DENDROCOLAPTES SANCTI-THOMÆ, Lafr.

Not uncommon.

FORMICARIIDÆ.

THAMNOPHILUS DOLIATUS (Linn.).

Common up to Bebedero.

DYSITHAMNUS STRIATICEPS, Lawr.

Very rare; specimens procured in thickest part of forest.

CERCOMACRA TYRANNINA, Scl.

Common in Miravalles.

RAMPHOCÆNUS RUFIVENTRIS, Bonap.

Not common.

HYPOCNEMIS NÆVIoidES.

The most common species of the Formicariidæ in Miravalles.

† FORMICARIUS UMBROSUS, Ridgway.

Not very common, but by its peculiar cry, not unlike that of some of the members of the Quail family, one can easily follow it up, and by imitating it bring it quite close. On the slightest alarm the call ceases, and a few minutes afterwards it is again heard, but at a long distance.

The bird runs along the ground like a Quail or Ground-Dove, feeding on insects, and is of solitary habits and only found in the densest forest.

† PHLOGOPSIS MACLEANNANI, Lawr.

Quite rare; but four specimens procured. These were shot in the act of feeding, on the ground or on stumps and branches near it.

TROCHILIDÆ.

CHLOROSTILBON CANIVETI, Less.

Quite common on edges of forests, gathering honey or insects from blossoming plants near the ground.

‡ AMAZILIA CINNAMOMEA (Less.).

Quite plentiful on the savannas in Miravalles; also observed near Bagaces.

† AMAZILIA ALFAROANA, sp. n.

Similar to *A. sophie*, but larger and the bill rather longer and more curved. On the underside there is little difference, but the under tail-coverts are dark steel-blue, with a narrow white margin. On the upper surface the green of the plumage has a distinct blue tint, which becomes more intense on the crown and forehead. The upper tail-coverts are as in *A. sophie*. The mandible is pale for about its basal half, the rest and the maxilla black. Total length about 1.0 inches; wing 2.2; tail—outer rectrices 1.35, middle rectrices 0.25 shorter; bill 1.0*.

Something unfamiliar about this bird induced me to shoot

* [I have compared the specimen sent with *A. sophie* and with *A. cyanura*, which it also resembles, but it differs from the latter in the absence of the characteristic chestnut colour of the wings. The species is quite distinct so far as I can see.—O. S.]

it; it was the only specimen that I was able to procure, and was taken at a pretty high point. I dedicate this species to Don A. Alfaro, the Director of the National Museum of Costa Rica.

AMAZILIA RIEFFERI (Bourc.).

Specimens taken in Miravalles and Bagaces.

AMAZILIA SOPHIÆ, Bourc. & Muls.

Specimens from Miravalles and Bebedero.

FLORICOLA CONSTANTI (Delattre).

Two specimens procured, one in Miravalles and the other lower down.

PHAËTHORNIS LONGIROSTRIS, Less.

Some few specimens taken in the forest; however, not very abundant.

PYGMORNIS ADOLPHI (Gould).

Few seen and collected. Observed on edges of forest under same conditions as *Chlorostilbon caniveti*.

TROCHILUS COLUBRIS.

Only near Bagaces did I procure specimens of this bird, where I found it of an evening, going, bee-like, from flower to flower of small blossoming plants.

CAPRIMULGIDÆ.

NYCTIDROMUS ALBICOLLIS (Gm.).

This bird is common at all parts from Miravalles to Bebedero.

CHORDEILES TEXENSIS, Lawr.

At a spot called Salitral, between Miravalles and Bagaces, one afternoon I observed a number of these birds flying round a ranch where I intended to pass the night; from these I secured my specimens: at first they were observed at quite an elevation, but as it got later they gradually descended.

PICIDÆ.

† MELANERPES HOFFMANNI (Cab.).

As common here as in San José. Native name for this family of birds "Carpintero" (carpenter).

† CAMPEPHILUS GUATEMALENSIS (Hartl.).

Seems to be fairly plentiful.

MOMOTIDÆ.

† MOMOTUS LESSONI, Less.

Not so common here as in the interior. Known over the country by the name of "Bobo."

† EUMOMOTA SUPERCILIARIS (Jard. & Selby).

I looked carefully for this bird in Miravalles, but was unable ever to see a single specimen; lower down, however, near Bagaces, it is not uncommon, and in Bebedero it is quite abundant.

PRIONORHYNCHUS PLATYRHYNCHUS (Leadb.).

But one specimen procured.

† HYLOMANES MOMOTULA, Licht.*

The birds labelled as such I think to be of this species; they are the first examples, I believe, on record from Costa Rica. I hunted carefully for other specimens, but was unable to procure more than three altogether, one of which remains in the collection of the Museo Nacional of Costa Rica.

ALCEDINIDÆ.

† CERYLE SEPTENTRIONALIS, Sharpe.

Fairly abundant in Miravalles.

TROGONIDÆ.

† TROGON ELEGANS, Gould.

This family of birds are known in this part of the country as "Viuda," the appellation of the Blue Tanager (*Tanagra cana*) in the interior.

* [These specimens agree very closely with others from Mexico and Guatemala. The chestnut of the nape is slightly more diffused.—O. S.]

I looked specially for this species in Miravalles as much as I looked for *T. aurantiiventris* at Bagaces, but these two species seem to adhere strictly to their respective elevations.

TROGON AURANTHIVENTRIS, Gould*.

Only taken in Miravalles, and the specimens procured were the result of diligent search, as they are not by any means common. I found them to be the wildest of the Trogons inhabiting these parts, hardly allowing one to get within gun-shot.

TROGON ATRICOLLIS, Vieill.

Commonest in lower regions.

└ TROGON MELANOCEPHALUS, Gould.

In Miravalles rarely seen, but as one approaches Bagaces it gradually becomes more plentiful; however, I have taken specimens at the highest point of collecting.

TROGON CALIGATUS, Gould.

Like *T. atricollis*, commoner in lower regions.

TROGON MASSENA, Gould.

Four specimens taken in Miravalles; no others observed.

BUCCONIDÆ.

MALACOPTILA PANAMENSIS, Lafr.

Very few specimens observed in Miravalles; two specimens procured.

CUCULIDÆ.

| CROTOPHAGA SULCIROSTRIS, Sw.

At almost all parts of the country, at almost all elevations, so soon as there are signs of cultivation and clearings made for the cattle, the familiar cry of these birds is heard.

‡ MOROCOCCYX ERYTHROPYGIA (Less.).

Seems to show no preference for one point to another between Bebedero and Miravalles.

* [The birds sent by Mr. Underwood are of a deep orange-red, and are intermediate between *T. puella* and *T. aurantiiventris*.—O. S.]

† NEOMORPHUS SALVINI, Scl.*

During my stay at Miravalles I observed only about four of these birds, of which I managed to secure two. It is only seen in the deep forest, hopping, Cuckoo-like, on or near the ground. The natives in these parts firmly believe that wherever this bird is found, a "leon," as the puma is called all over Costa Rica, is near at hand; hence the native name, "Guia-leon" (Guide to the lion).

RHAMPHASTIDÆ.

+ RHAMPHASTOS CARINATUS, Sw.

This bird I have taken generally in the same localities as *R. tocard*; but in Miravalles not a single specimen of the latter did I observe, although nowhere did I see *R. carinatus* so common as in Miravalles. Its familiar name is "Cuni."

+ PTEROGLOSSUS TORQUATUS (Gm.).

Not so common here as lower down.

PSITTACIDÆ.

+ ARA MACAO (Linn.).

Common.

+ BROTOGERYS TOVI (Gm.).

Flocks of these birds are constantly heard passing from one place to another; equally abundant in Bebedero.

+ CONURUS CANICULARIS (Linn.).

Not so common here as *B. tovi*.

+ CHRYSOTIS ALBIFRONS (Sparrm.).

Plentiful, feeding on the fruit of the "guagabo" (guava), an abundant tree in Miravalles, where it dots the pasture-grounds, and is preserved, as the cattle are very fond of the fruit.

+ CHRYSOTIS AUROPALLIATA (Less.).

Very rare so high up; in fact I only remember seeing some three or four pairs flying over the whole time I was

* [Recorded from Nicaragua, but not before noticed in Costa Rica.—O. S.]

there. But, on the other hand, in Bagaces these Parrots are extremely abundant, and regularly make the town their headquarters; in fact the traveller arriving there a little before sunset is often deafened by their noise, and on his first visit is amazed at the strange scene. From all sides arrive innumerable bands and solitary pairs of "Loros" (the Spanish name), which remain for about an hour squabbling and fighting, constantly changing their perches before going to roost in the low trees in the immediate vicinity of the houses. "Supas" (Macaws) also make the town their roosting-quarters. At daybreak there is a repetition of the noise; they then go off to their various feeding-grounds.

The natives here appreciate a good talking Loro as a pet as much as Europeans do. The young are eagerly sought after, and the birds, when they begin to talk, which is generally at about a year old, sell for fairly good prices. This species seems to be by far the most easily taught.

FALCONIDÆ.

FALCO SPARVERIUS, Linn.

The Hawks do not appear so abundant in the high as in the lowlands, although there are few localities where this species at least is not found abundantly. It is the commonest species here.

+POLYBORUS CHERIWAY (Jacq.).

Several seen on the savannas, feeding, I should judge, on worms and insects; also observed in company of *Cathartes atratus* in the vicinity of carcasses of horses or oxen.

+SPIZAËTUS ORNATUS (Daud.).

One or two specimens procured; one disturbed in his repast off a squirrel, which, however, he took away with him in his flight.

CATHARTIDÆ.

+GYPAGUS PAPA (Linn.).

Several seen. Called "Rey de los Zopilotes" (King Vulture).

+ *CATHARTES ATRATUS* (Bartr.).
Common. Called "Zopilote."

+ *CATHARTES AURA* (Linn.).
Not so common as *C. atratus*.

COLUMBIDÆ.

+ *COLUMBA RUFINA*, Temm.

One of the most abundant Pigeons of Miravalles. Of an afternoon one would see numbers of them conspicuously seated on the highest branches of the trees, standing out in relief against the sky.

+ *LEPTOPTILA VERREAUXI* (Bonap.).
Common in second-growth woods.

+ *LEPTOPTILA CASSINI* (Lawr.).

A good many met with in the forests on the ground. At one's approach they would get up and fly to a short distance, when one could then generally get quite near them.

+ *PERISTERA CINEREA* (Linn.).
Few seen.

+ *CHAMÆPELIA PASSERINA* (Linn.).

Very common, especially on the road leading to Bagaces.

+ *MELOPELIA LEUCOPTERA* (Linn.).

Very common by the roadside, where they can be seen in flocks feeding on the ground, at which times I have got as many as a dozen at a shot. They are commonest in the neighbourhood of Bagaces and between there and Bebedero.

+ *ZENAIDURA CAROLINENSIS* (Linn.).

Plentiful everywhere between Miravalles and Bebedero.

+ *GEOTRYGON MONTANA* (Linn.).

Four specimens shot in thick forest. Not at all abundant.

+ *GEOTRYGON VIOLACEA*, Temm.*

(Brilliant purple-black.) Quite rare. The specimens were taken at one of the highest points of my rambles. In

* [New to Costa Rica, but found in the State of Panamá.—O. S.]

the thick woods some were shot feeding on the ground and others in low branches. Seen in small flocks of four or six.

CRACIDÆ.

+ PENELOPE CRISTATA (Linn.).

Plentifully seen in the jobo trees, and also on the ground, feeding on the fallen fruit of the same tree.

+ ORTALIS CINEREICEPS (Gray).

Not common; some four specimens procured. These birds, unlike the other "Pavas," as birds of this family are called, though particularly noisy at other times, generally remain quiet in the trees when one is searching for them, or at least do not hurry to escape, unless thoroughly aroused.

I have once or twice seen a party of four or six, and having shot one, have hunted round for the others, and have only discovered them after a long search, and then perhaps I have descried one or two motionless just over my head. "Chachalaca" is the native name for this bird.

+ CRAX GLOBICERA, Linn.

This bird, the native name of which is "Pavon," is quite common, although perhaps rather scarcer than *Penelope cristata*. They both are noisy birds, and generally the first intimation of their presence is given by their loud hoarse cry, which suddenly breaks the stillness of the forest as they get themselves quickly to a distance; their wings sound in the air and against the twigs as they heavily rise from the ground.

I shot once at a *P. cristata* and stunned it somewhat, a pellet just grazing its skull. I caught it before it could recover itself and take wing. After a few days it became quite tame. The natives when they come across eggs of either "Pavon" or "Pava," take them home and hatch them under a domestic hen. The birds are hardy and thrive well in captivity. We have had a couple of *C. globicera* for about five years confined in an aviary at the museum.

PERDICIDÆ.

†EUPSYCHORTYX LEYLANDI (Moore).

This "Codorniz" (Quail), as it is known all over the country, is the commonest of the family. Their well-known cry is heard in the fresh of the morning as one passes patches of second-growth woods, and the bird itself seen, either perched on a stone or stump or running into hiding.

†ODONTOPHORUS MELANOTIS, Salv.

Only one specimen secured; no others seen.

TINAMIDÆ.

TINAMUS ROBUSTUS.

One procured, but very few seen; a very shy bird and very difficult to shoot. One occasionally comes across it in the deep forest, but a passing glance at a distance is all one usually gets of it.

†CRYPTURUS BOUCARDI (Sallé).

Very rare, but one specimen procured.

CHARADRIIDÆ.

ÆGIALITIS VOCIFERA (Linn.).

Occasionally observed.

SCOLOPACIDÆ.

TOTANUS SOLITARIUS.

As in most parts of Costa Rica, one notices it in swampy places and beside rivers.

ACTITIS MACULARIA (Linn.).

Also seen, but not so common as the former.

CICONIIDÆ.

TANTALUS LOCULATOR, Linn.

Several noticed in the lagoons in company of various Herons. Common name of this bird "Garzon."

† MYCTERIA AMERICANA, Linn.

I occasionally saw these big birds in lagoons. They generally go in pairs, and can be seen daily at the same spot. The native name is "Galau sin ventura" (The luckless Gallant).

PLATALEIDÆ.

† AJAJA ROSEA, Reichenb.

One or two seen now and again in the lagoons, but they rarely come so high up, remaining, as a rule, in the rivers near the coast. "Garza morena" is the inappropriate name given it, and literally means Brown Heron.

ARDEIDÆ.

ARDEA EGRETTEA, Gm.

Abundant about the lagoons.

ARDEA CÆRULEA, Linn.

Seen plentifully in same localities.

BUTORIDES VIRESCENS (Linn.).

Occasionally seen. Birds of this family are commonly called "Garzas"—"Garza blanca" (White Heron), "Garza pequeña" (Small Heron), &c.

TIGRISOMA CABANISI, Heine.

Generally observed solitary by the riversides and in secluded parts of lagoons.

ARAMIDÆ.

† ARAMIDES PLUMBEICOLLIS, Zeledon.

Two specimens procured; only one other seen: they are very tame, allowing one to approach quite close.

ANATIDÆ.

† DENDROCYGNA AUTUMNALIS (Linn.).

This and the following are the common Ducks that one finds abundantly in the lagoons and by the riversides all the way from Bebedero to Miravalles, although this species prevails in numbers.

+CARINA MOSCHATA (Linn.).

This Duck, unlike *Dendrocygna autumnalis*, is difficult to rear in captivity, always escaping at the first opportunity. The former, however, is very easily domesticated, going off repeatedly on visits to the lagoons; but it does not appear at all anxious to remain there, as it returns generally the day after.

XL.—*On the Change of Birds to Spring Plumage without a Moult.* By JOHN GUILLE MILLAIS.

(Plate X.)

IN the 'Bulletin of the American Museum of Natural Science' (vol. viii.), Mr. J. A. Allen has recently published a series of articles on "the alleged Changes of Colour in the Feathers of Birds without Molting" [*sic*], in which he seriously impugns the accuracy of statements made by many naturalists of repute. In so doing he is rather dogmatic; for instance, when he sums up Yarrell's researches respecting the spring change of the Golden Plover as, "of course, pure inference, based on lack of knowledge on the condition of the plumage on the Plover's breast in normal breeding condition."

Seeing that Mr. Allen brings no proof to back up his statement that the feather, after being once complete, becomes exhausted and falls like a leaf from a tree, it seems hardly necessary to argue upon a question which microscopic research, on a thoroughly scientific basis, will alone be capable of solving. I shall therefore simply give a short review of my own studies on the subject of spring feather-change.

It has always seemed to me a curious fact that more British ornithologists have not turned their attention to the change of plumage in birds, since the field is so wide and the subject so unhackneyed. All the adult stages are now well shown in their full plumages by the excellent illustrations we have in modern publications; but the transition from youth to maturity, and the phases of plumage which even the old bird goes through during the several seasons, and